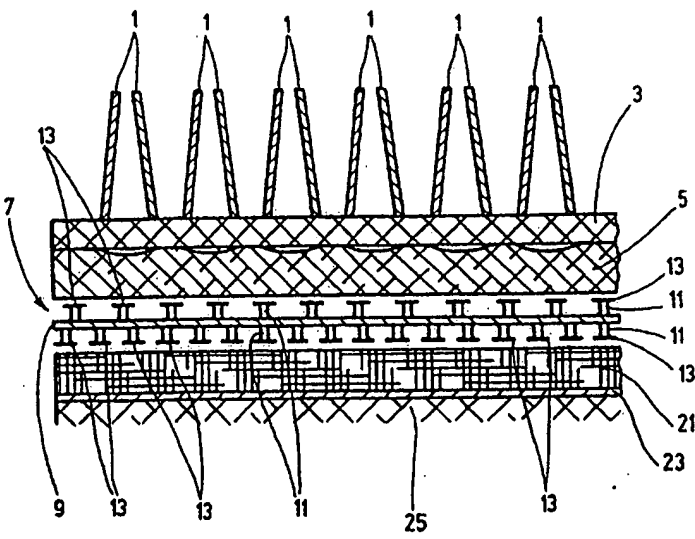


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<p>(54) Title: FLOOR CARPET INSTALLING SYSTEM</p> <p>(54) Bezeichnung: BODENTEPPICH-VERLEGESYSTEM</p> <p>(57) Abstract</p> <p>The invention relates to a system for installing floor carpets, comprising a carpet whose nap side (1) forms the useful surface and anchoring means (7) that can be fixed to the floor surface (25), said means having protuberant interlocking means (11) that interlock with the backside (5) of the carpet opposite the nap side. According to the invention, the backside (5) of the carpet is formed by a material having no loops and the anchoring means comprises a loopless material (21) glued to the floor surface (25), in addition to a micro-adhesive closure element (7) having interlocking elements on both sides in the form of fingers (11) that have thickenings (13) on the end side which interlock with the loopless backside (5) of the carpet and with the loopless material (21) on the floor surface (25).</p> 		

### **Floor Carpet Installing System**

The invention relates to a floor carpet installing system with a carpet which forms the usable surface with its front side and an anchoring means which can be attached to the floor surface and which has projecting interlocking elements which engage the reverse side of the carpet facing away from the pile side by interlocking.

A carpet installation system of this type is already known from EP 0 321 978 B1. In the known system the reverse side of the carpet has loop elements which project beyond the product base and which the hooks of the anchoring means, which can be attached to the floor, engage.

This type of anchoring of the carpet on the floor has inadequacies. As has been shown, the interaction of the hooks and the free loops which are located on the reverse side of the carpet does prevent lifting of the carpet, but this type of anchoring does not form an adequately secure bond to prevent displacement along the plane of the carpet. As a result, during use the formation of bubbles and ripples can occur, in particular under higher stresses, for example when moving heavy pieces of furniture, there is the danger of major damage.

The object of the invention is to devise a carpet installation system which ensures accordingly improved anchoring between carpet and floor.

In a carpet installation system of the type mentioned in the foregoing, this object is attained as claimed in the invention in that the reverse side of the carpet facing the anchoring means is formed by a non-looped material and that the anchoring means has a non-looped material which is cemented to the floor surface and a microfastener element, which on both side has interlocking elements in the form of stalks with end-side thickened areas, which on the one hand interlock with the non-looped reverse side of the carpet and on the other hand with the non-looped material on the floor surface.

The anchoring as claimed in the invention by means of double-sided microfastener with an adhesive fastener element which has interlocking elements located on both sides in the form of stalks with end-side thickened areas, which interlock on each side with non-looped material, results in several advantages. On the one hand, the interlocking with the non-looped material, the interlocking not taking place by way of loop elements, but by direct engagement of the interlocking elements with the structure of the material, yields an especially reliable bond with regard to relative movements along the plane of the carpet so that the problems which arise in the prior art due to displacement are avoided. On the other hand, because the adhesive fastener element is not cemented directly to the floor surface, but interlocks with the likewise non-looped material, which is attached to the floor surface, the danger is avoided that shrinkage or ripples, which occur when the floor surface ages or sets, could lead to detachment of the anchoring because the non-looped material located on the floor surface forms a compensation layer with a certain compliance. In addition, this layer, which is attached to the floor surface, also acts to dampen the noise of walking.

Another special advantage is that by choosing the dimensions, the geometry and/or the choice of the number of interlocking elements per unit of area, the interlocking action on the two sides of the adhesive fastener element can be appropriately selected. Thus, for example, the adhesive action on the bottom side of the adhesive fastener element which faces the floor surface can be selected to be stronger than the adhesive action relative to the non-looped material on the

reverse side of the carpet. When the carpet is lifted, which is possible in interlocking with the non-looped material on the reverse side of the carpet by overcoming the adhesive force, the adhesive fastener element in this case remains interlocked to the floor-side non-looped material so that after the carpet is lifted re-installation is possible without additional measures.

For the installation system as claimed in the invention a microfastener element is suited which is configured similarly to the element known from DE 196 46 318 A1, but differs from it in that the corresponding interlocking elements are molded not only on the front side, but also on the reverse side of the backing.

Depending on the product base of the carpet which is to be installed, i.e., depending on the structure of the reverse side, a microfastener can be used with the thickness of the backing of the interlocking elements from 0.1 to 0.5 mm and with 20 to 600 interlocking elements per cm<sup>2</sup> on each side.

The thickened areas of the stalks of the interlocking elements can have the shape of mushroom heads or plate-shaped heads, the heads on their top side preferably being provided with concave recesses. A process for especially simple production of microfastener elements with these interlocking elements in a one-sided arrangement is proposed in German Patent Application 198 28 856.5.

When using interlocking elements which have recesses on the top side of the heads, the recesses of the heads can be provided with an adhesive which effects additional bonding to the reverse side of the carpet and/or the floor-side material, for example by spread coating.

Textile materials in the form of felts and nonwovens as well as loose leno or smooth knit fabrics and non-woven textiles (nonwoven materials) can be provided as the reverse side of the carpet and as the non-looped material which is cemented to the floor.

The invention will be described in greater detail below with the aid of the drawings in which:

- FIG. 1 shows a schematically simplified and broken-away section of the components of the carpet installation system as claimed in the invention;
- FIG. 2 shows a perspective, highly enlarged view of a double-sided microplastic adhesive fastener element, a single interlocking element being shown even more enlarged and cutaway, and
- FIG. 3 shows a broken-away top view drawn in approximately natural size of the non-looped reverse side of the carpet from FIG. 1.

FIG. 1 shows in an enlarged simplified schematic a section of a carpet with pile elements 1 of the conventional type, which extend up from a connecting layer 3 and which form the pile side of the carpet which is used as the usable surface. The reverse side 5 facing away from the pile side is formed by a non-looped material. Materials can be used for this purpose, which impart to the carpet structure a specific stiffness, directional stability and cut resistance. For this purpose, they can be felts or nonwovens which acquire their mechanical coherence by tufting processes and are cemented to the connecting layer 3 of the carpet. Loose leno or smooth right/left knits and other so-called nonwoven materials are also suitable for this purpose.

FIG. 2 shows a section of a strip of a microplastic adhesive fastener element 7 similar to the one shown in DE 196 46 318 A1. The thermoplastic (for example, polyolefins or blends of polyamides are possible) strip formed in the gap between an upper and a lower forming tool forms a film-like backing 9 with stalks 11, which project from its top side and bottom side. The stalks 11, which project from the top side of the backing 9 and which have thickened ends which

form mushroom or plate-shaped heads 13 interlock with the non-looped material of the reverse side 5 of the carpet by direct engagement with the structure, which is shown by way of a section in FIG. 3 in a top view. Depending on the mechanical structure and fineness of this structure of the reverse side 5 of the pertinent carpet, the arrangement of the stalks on the front side of the backing 9 has a packing density of approximately 20 to 600 stalks 11 per  $\text{cm}^2$ , at a thickness of the backing 9 of approximately 0.1 to 0.5 mm. Other packing densities and/or thicknesses of the backing 9 can of course be used depending on the specific circumstances.

The stalks 11 which project from the top side of the backing 9 and which have end-side heads 13 which are shaped in the same manner as is the case in the stalks 11 on the top side accordingly engage a non-looped material 21, which is connected by way of an adhesive layer 23 to the floor surface 25, the interlocking of the heads 13 again taking place by direct engagement with the structure of the non-looped material 21. The floor-side non-looped material is a textile material similar to the reverse side 5 of the carpet, that is a so-called nonwoven textile material, i.e., a fiber composite with a mechanically or physicochemically compacted structure, which includes mainly various nonwoven and stitch-bonded products, and also felts. The adhesive layer 23 can be a hot melt-based acrylate cement. The non-looped material 21, which is provided as a compensation element with regard to dimension changes of the floor surface 25 as a result of shrinkage or aging processes, so that no problems arise on the double-sided adhesive fastener element 7, also acts to dampen the noise of walking, especially with a suitable selection of material.

As mentioned in the foregoing, a different configuration of the heads 13 on the top side and bottom side of the adhesive fastener element 7 enables the adhesive action on the top side and bottom side to be different. For a strong adhesive action on the bottom side, lifting of the carpet is possible without the adhesive fastener element 7 lifting off the floor-side material 21; this makes possible a re-installation of the carpet on a remaining adhesive fastener element 7.

There can be adhesive fastener elements 7 when installing carpets from wall to wall in the form of long strips or bands. When the carpet is installed in the form of tiles, there can be shorter strip segments matched to the individual tiles in a suitable manner.

As can be seen especially from the sectional illustration shown highly enlarged in FIG. 2, the thickened heads 13 of the stalks 11 of the adhesive fastener element 7 are formed into a mushroom or plate shape with a concavely arched top so that within the edge of the heads 13 a depression 15 is formed.

The depression 15 of the heads 13 can be filled with an adhesive, as is shown in the illustrated example. The adhesive can be applied by brushing it on or spread coating, in order to effect additional bonding after completed interlocking with the reverse side 5 of the pertinent carpet and/or with the floor-side material 21 by engagement. The adhesive can be, for example, an acrylate-based contact adhesive, for example 2-ethylhexylacrylate or butyl acrylate, preferably in mixing ratios which are chosen differently in order to vary the softening, plasticity, and adhesive force as desired and necessary. There can be filling of the recesses 15 with adhesive on both or only on one of the sides of the adhesive fastener element 7.